

PATENT SPECIFICATION



Application Date: Sept. 9, 1927. No. 23,794/27.

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PROVISIONAL SPECIFICATION.

No. 23,794, A.D. 1927.

Improvements relating to Lifting Apparatus.

We, SYDNEY HODGES, of Twynham Works, Christchurch, Hants, and GEORGE FREDERICK CULLEN SAUNDERS, of Greyfriars, Christchurch, Hants, both of British nationality, do hereby declare the nature of this invention to be as follows:—

This invention relates to lifting apparatus especially for the purpose of raising invalids or others as for example from bed to chair or vice versa, and it has for its object to provide an apparatus that is conveniently handled and with convenient means for raising the invalid and for moving the invalid in the raised position.

According to the invention a pivoted carrying frame is provided adapted to hinge or pivot upon a substantially horizontal axis, the longitudinal frame members extending from the pivoting or hinging axis to a convenient length and being provided near their outer ends with hooks or other fastenings for the purpose of supporting a sling, seat, couch or other support, it being understood that the invalid is supported at a position between the outwardly extending longitudinal members of the pivoting frame.

The pivoted carrying frame is supported at a position adjacent the pivoting or hinging axis by means of a substantially vertically disposed strut or pillar which may be provided in the form of a cylinder or tube for the reception within it of an hydraulic ram. The tube or cylinder communicates with another cylinder containing an operating piston or ram and a liquid such as oil is used as the means for applying pressure from the operating piston or ram to the hydraulic lifting ram which is set within the strut or tube as aforesaid, so that thus the carrying frame may be raised into a determined position as may be required in the use of the apparatus, and may again be lowered.

The carrying frame is advantageously supported at the rear by a substantially vertically disposed frame, and this frame

as well as the strut or pillar are carried upon a base frame in general conforming to the shape of the carrying frame, but advantageously a little longer and wider, and the carrying frame as well as the base frame are provided with transversely disposed members parallel with the rear parts of the respective frames, it being understood that the front end of the carrying frame and the base frame are open, so that thus the whole apparatus, which is conveniently supported upon pivotally mounted wheels or castors, can be brought into position to surround a chair or into position over a bed, so that thus by its means invalids may be very conveniently moved from bed to chair or vice versa.

The invention also comprises the features which are hereinafter described.

In carrying the invention into effect according to one construction we provide the apparatus principally of tubing, and both the carrying frame and the base frame of the apparatus are formed of a substantially U-shape, in which however a transversely disposed member is provided disposed parallel with the rear part of the respective frames. The longitudinal members of both the carrying frame and the base frame are provided with braces. Thus the longitudinal members of the base frame may be each provided with two strut members and a tension member in mid-position and disposed vertically downward, and the tension member may extend beneath and between the strut members aforesaid and their respective ends extended and connected at the front and the rear respectively of the longitudinal frame members. A similar provision is made above the longitudinal members of the carrying frame. At the corners the base frames may be advantageously provided with elbow bends and with angularly disposed pieces for the support of the brackets on which the respective rear wheels are pivotally mounted and the front wheels may be

mounted upon suitable fittings so as to be disposed in fixed alignment with the respective longitudinal members of the base frame.

5 The carrying frame is supported at the rear by a frame comprising two vertically disposed tension members which are connected together by diagonal braces, and these vertically disposed members are
10 caused to encircle the rear part of the base frame and at the opposite upper ends to encircle the rear member of the carrying frame. The carrying frame is also provided as hereinbefore described with a
15 transversely disposed member parallel with the rear member of the carrying frame, suitable connecting fittings being provided for the purpose, and generally the construction of the respective frames
20 and their connection together are effected in the manner that is usual in the manufacture of bicycle frames and similar frame parts.

In a central position the transverse
25 member of the carrying frame referred to is adapted for the reception of the hydraulic ram which is provided to fit within the upper end of the hydraulic cylinder or tube of which the strut or
30 pillar is formed. Mid-way in the length of the strut or pillar a transversely disposed tube or cylinder is connected, at the opposite end of which an operating piston is fitted which extends to the rear and is
35 adapted by means of a screw-threaded fitting to be moved by a screw-threaded rod forward and backward within the tube, this being conveniently done by means of a cranked handle; it being

understood that the respective hydraulic
40 ram and operating piston are suitably packed, and that cup leathers or other packing rings are provided to ensure effective hydraulic joints. It will be understood that on the rotation of the operating
45 handle the operating piston may be moved forward whereby hydraulic pressure is imposed within the hydraulic cylinder or tube by which the ram is raised to the extent desired, thus lifting the carrying
50 frame to a corresponding extent on its pivoting axis.

The carrying frame is provided near its ends with hook fittings or other means for carrying a sling, seat, couch or the like. The transversely disposed member of the base frame by which the strut or pillar is supported may be reinforced by tension members in a similar manner to the longitudinal members of the respective frames.

It will be understood that by so determining the proportions of the operating piston and the hydraulic ram the necessary pressure may be very conveniently imposed by a nurse or attendant for the purpose of raising the carrying frame to the necessary extent.

It will furthermore be understood that the invention is not limited to the constructional features hereinbefore specifically described and that the construction may be varied without departing from the invention.

Dated this 9th day of September, 1927.
EDWARD EVANS & Co.,
27, Chancery Lane, London, W.C. 2,
Agents for the Applicants.

PROVISIONAL SPECIFICATION.

No. 16,884, A.D. 1928.

Improvements relating to Lifting Apparatus.

We, SYDNEY HODGES, of Twynham Works, Christchurch, Hants, and GEORGE
75 FREDERICK CULLEN SAUNDERS, of Greyfriars, Christchurch, Hants, both of British nationality, do hereby declare the nature of this invention to be as follows:—

This invention relates to lifting apparatus especially for the purpose of raising
80 invalids or others as, for example, from bed to chair or vice versa, and it has for its object to provide a simple form of the apparatus that is described in the Specification of our application for Letters Patent No. 23,794/1927.

According to the invention the movement of the carrying frame is effected by

means of screw or like gearing instead of by means of a hydraulic lifting ram.

According to the invention the carrying frame is pivoted to turn about a substantially horizontal axis upon a substantially
95 vertically disposed frame carried by a base frame substantially of the same shape as the carrying frame and at a distance from the pivotal axis the carrying frame is supported by means of a vertically disposed
100 spindle pivoted at its upper end to the carrying frame and screw-threaded throughout its length for engagement with a screwed nut or sleeve suitably supported from the base frame and adapted
105 to be rotated by gearing.

The gearing may be of the worm and

worm wheel type, the worm wheel being carried by or forming part of the nut or sleeve before referred to. Or again it may be provided in the form of bevel gear, one of the members of which may be secured to or be formed integrally with the nut or sleeve.

The invention is, however, not confined to the particular form of gearing used for effecting the rotation of the nut or sleeve and it will be understood that the invention also covers the equivalent arrangement of the mechanism in which the sleeve or nut is pivoted to the carrying frame and the screwed spindle is mounted rotatably in connection with the base frame.

In carrying the invention into effect according to a particular construction of the apparatus, the carrying frame comprises a pair of longitudinal members connected together at one end by a transverse member so that a substantially U-shape frame is formed. A base frame also substantially of a U-shape, but preferably wider than the carrying frame, is provided for the support of the carrying frame and the operating mechanism. The longitudinal portions of the U-shaped base frame are strengthened by downwardly extending struts and tie members, and the frame is advantageously mounted upon four wheels or runners, two of which are disposed respectively in fixed positions at the outer or free ends of the longitudinal members of the frame, while the remaining two wheels or runners are respectively mounted rotatably upon diagonally disposed carrying bars secured across the corners of the U-shaped frame. At an intermediate point along the longitudinal parts of the base frame there is pivotally mounted a transverse bar or tube serving to support at the middle an upstanding tube into which the screwed spindle for lifting the carrying frame may be received. The said tube extends downwardly below the transverse tube or bar and is suitably tied thereto in such manner as to give the necessary strength and rigidity. At the upper end the said tube is fitted on the exterior with a split collar which may advantageously be provided with a loop or eyelet. The upper surface of the said split collar, together with the upper end of the tube serves to support the centrally disposed boss of a box or casing adapted to contain the operating gear. Within the said box or casing is mounted a worm wheel which advantageously has an extended boss which is received into the boss of the box or casing. The bore of the worm wheel is screw-threaded to engage with the screwed spindle pivoted to the carrying frame.

The worm for operating the worm wheel

is mounted upon a horizontally disposed spindle which extends outwardly from the casing and within the casing is received in suitable bearings. A bracket is advantageously mounted upon the under surface of the casing and is extended outwardly to support the spindle at a distance from the casing. At its free end the spindle is provided with a crank handle.

The longitudinal members of the carrying frame, which at their forward or free ends are provided with hooks or other fastenings for the purpose of supporting a sling, seat, couch or the like, are fitted at suitable points along their length with bracket or like fittings provided with bearings for a transverse tube or bar carried therein and secured or connected at its middle to the upper end of the screw-threaded spindle which engages the worm wheel before referred to, in such manner that upon rotation of the worm wheel the screw spindle rises or falls in the tube carried by the base frame, and thus elevates or lowers the carrying frame. At the rear end the transverse member of the carrying frame is tied to the base frame by a frame comprising two vertically disposed tension members which are connected together by diagonal braces, the vertically disposed members being caused to encircle the rear or transverse part of the base frame at the lower end, and at the upper ends to encircle the transverse members of the carrying frame. The vertically disposed tension members advantageously serve to receive horizontally disposed handles by which the apparatus may be moved or trundled on the wheels. The bracket or like fittings of the carrying frame may serve to receive upstanding struts to which are connected diagonal braces or tension members for strengthening the carrying frame, the said braces or tension members extending to the rear end of the longitudinal members and towards the forward end thereof. Between the struts and the forward points of connection of the braces or diagonal tension members the longitudinal members of the carrying frame may be provided with movably mounted clips.

The casing containing the worm and worm wheel is advantageously fitted with a cover through which the screwed spindle extends, the casing and cover serving as an oil bath in which the worm and worm wheel operate.

The boss of the casing is advantageously fitted with a boss in which is mounted a screw-threaded pin cranked at the outer end to form a handle, which pin serves to bind the nut or sleeve within the casing when the screwed spindle has been adjusted to the desired elevation.

It will be understood that the invention is not limited to the particular details of construction hereinbefore described.

Dated this 11th day of June, 1928.
EDWARD EVANS & Co.,
27, Chancery Lane, London, W.C. 2,
Agents for the Applicants.

COMPLETE SPECIFICATION.

Improvements relating to Lifting Apparatus.

We, SYDNEY HODGES, of Twynham Works, Christchurch, Hants, and GEORGE FREDERICK CULLEN SAUNDERS, of Greyfriars, Christchurch, Hants, both of British nationality, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to lifting apparatus especially for the purpose of raising invalids or others as for example from bed to chair or vice versa, and it has for its object to provide an apparatus that is conveniently handled and with convenient means for raising the invalid and for moving the invalid in the raised position.

According to the invention a pivoted carrying frame is provided, adapted to hinge or pivot upon a substantially horizontal axis, the longitudinal frame members extending from the pivoting or hinging axis to a convenient length and being provided near their outer ends with hooks or other fastenings for the purpose of supporting a sling, seat, couch or other support, it being understood that the invalid is supported at a position between the outwardly extending longitudinal members of the pivoting frame.

The pivoting frame is supported at a position adjacent the pivoting or hinging axis by means of a substantially vertically disposed strut or pillar which may be provided in the form of a cylinder or tube for the reception within it of an hydraulic ram or to receive a screw and gear operating mechanism.

The carrying frame may be pivoted to turn about a substantially horizontal axis upon a substantially vertically disposed frame carried by a base frame substantially of the same shape as the carrying frame and at a distance from the pivotal axis the carrying frame may be supported by means of a vertically disposed spindle pivoted at its upper end to the carrying frame and screw-threaded throughout its length for engagement with a screwed nut or sleeve suitably supported from the base frame, the nut or spindle being adapted to be rotated by gearing.

The gearing may be of the worm and worm wheel type, the worm wheel being carried by or forming part of the nut or

sleeve before referred to. Or again it may be provided in the form of bevel gear, one of the members of which may be secured to or be formed integrally with the nut or sleeve.

The carrying frame is supported at the rear by a substantially vertically disposed frame serving as a tie or link, and this frame as well as the strut or pillar are carried upon a base frame in general conforming to the shape of the carrying frame, but advantageously a little longer and wider, and the carrying frame as well as the base frame are provided with transversely disposed members parallel with the rear parts of the respective frames, it being understood that the front end of the carrying frame and the base frame are open, so that thus the whole apparatus, which is conveniently supported upon pivotally mounted wheels or castors, can be brought into position to surround a chair or into position over a bed, so that thus by its means invalids may be very conveniently moved from bed to chair or vice versa.

The invention comprises the features which are hereinafter described.

The accompanying drawings illustrate two constructions of apparatus according to the invention, by way of example.

Figure 1 is a perspective view of one construction of the apparatus in which a worm and worm wheel lifting gear is used.

Figure 2 is a sectional elevation of the lifting gear of the apparatus shown in Figure 1, to an enlarged scale.

Figure 3 is a sectional plan view of the lifting gear shown in Figure 2.

Figure 4 is a side elevation of a modified construction of the apparatus in which a hydraulic lifting gear is used.

In carrying the invention into effect according to the particular construction of the apparatus illustrated in Figures 1 to 3, the carrying frame comprises a pair of longitudinal members *a* connected together at one end by a transverse member *a*¹ so that a substantially U-shape frame is formed. A base frame *b* also substantially of a U-shape, but preferably wider than the carrying frame, is provided for the support of the carrying frame and the operating mechanism. The longitudinal portions *b* of the U-shaped

base frame are strengthened by downwardly extending struts b^2 and tie members b^3 , and the frame is advantageously mounted upon four wheels or runners c , two of which are disposed respectively in fixed positions at the outer or free ends of the longitudinal members b of the frame, while the remaining two wheels or runners are respectively mounted rotatably upon diagonally disposed carrying bars b^4 secured across the corners of the U-shaped frame. At an intermediate point along the longitudinal parts b of the base frame there is mounted a transverse bar or tube d serving to support at the middle an upstanding tube d^1 into which the screwed spindle e for lifting the carrying frame may be received. The said tube extends downwardly below the transverse tube or bar d and is suitably tied thereto in such manner as to give the necessary strength and rigidity. At the upper end the said tube is fitted on the exterior with a split collar d^2 which may advantageously be provided with a loop or eyelet. The upper surface of the said split collar, together with the upper end of the tube serves to support the centrally disposed boss f^1 of a box or casing f adapted to contain the operating gear. Within the said box or casing is mounted a worm wheel f^4 which advantageously is supported upon a ball or roller bearing and may have an extended boss which is received within the box or casing f . The bore of the worm wheel f^4 is screw-threaded to engage with the screwed spindle e pivoted to the carrying frame.

The worm g for operating the worm wheel is mounted upon a horizontally disposed spindle g^1 which extends outwardly from the casing and within the casing f is received in suitable bearings g^2 . A bracket f^3 is advantageously mounted upon the under surface of the casing and is extended outwardly to support the spindle g , or an operating spindle engaging therewith, at a distance from the casing. At its free end the spindle is provided with a crank handle g^3 .

The longitudinal members a of the carrying frame, which at their forward or free ends are provided with hooks or other fastenings a^3 for the purpose of supporting a sling, seat, couch or the like, are fitted at suitable points along their length with bracket or like fittings provided with bearings for a transverse tube or bar h pivotally carried therein and secured or connected at its middle to the upper end of the screw-threaded spindle e which engages the worm wheel before referred to, in such manner that upon rotation of the worm wheel the screw spindle e rises or falls in the tube d^1 carried by the base

frame, and thus elevates or lowers the carrying frame. At the rear end the transverse member a^1 of the carrying frame is tied to the transverse part b^1 of the base frame by a frame comprising two vertically disposed tension members i which are connected together by diagonal braces j , the vertically disposed members being caused to encircle the rear or transverse part of the base frame at the lower end, and at the upper ends to encircle the transverse members of the carrying frame. The vertically disposed tension members advantageously serve to receive horizontally disposed handles k by which the apparatus may be moved or trundled on the wheels. The bracket or like fittings of the carrying frame may serve to receive upstanding struts a^3 to which are connected diagonal braces or tension members a^4 for strengthening the carrying frame, the said braces or tension members extending to the rear end of the longitudinal members and towards the forward end thereof. Between the struts and the forward points of connection of the braces or diagonal tension members the longitudinal members of the carrying frame may be provided with movably mounted clips a^5 , to which may be attached links or struts for connection to the chair or the like carrying the invalid in order to avoid oscillation of the chair or the like.

The casing f containing the worm and worm wheel is advantageously fitted with a cover f^5 through which the screwed spindle e extends, the casing and cover serving as an oil bath in which the worm and worm wheel operate.

The boss of the casing is advantageously fitted with a boss in which is mounted a screw-threaded pin l cranked at the outer end to form a handle, which pin serves to bind the boss f^1 of the casing to the tube d^1 .

In carrying the invention into effect according to another construction as illustrated in Figure 4, we provide the apparatus principally of tubing, and both the carrying frame m and the base frame n of the apparatus are formed of a substantially U-shape, in which however a transversely disposed member m^1 , n^1 respectively is provided disposed parallel with the rear part of the respective frames. The longitudinal members of both the carrying frame and the base frame are provided with braces. Thus the longitudinal members of the base frame n may be each provided with two strut members n^2 and a tension member n^3 in mid-position and disposed vertically downward, and the tension member may extend beneath and between the strut members

aforesaid and the respective ends may be extended and connected at the front and the rear respectively of the longitudinal frame members. A similar provision is made in position above the longitudinal members of the carrying frame. At the corners the base frame may be advantageously provided with elbow bends and with angularly disposed pieces n^4 for the support of the brackets on which the respective rear wheels o are pivotally mounted and the front wheels m may be mounted upon suitable fittings so as to be disposed in fixed alignment with the respective longitudinal members of the base frame.

The carrying frame is supported at the rear by a frame q comprising two vertically disposed tension members which are connected together by diagonal braces, and these vertically disposed members are caused to encircle the rear part of the base frame n and at the opposite upper ends to encircle the rear member of the carrying frame m . The carrying frame is also provided as hereinbefore described with a transversely disposed member m^1 parallel with the rear member of the carrying frame and suitable connecting fittings being provided for the purpose, and generally the construction of the respective frames and their connection together is as usual in the manufacture of bicycle frames and similar frame parts.

In a central position the transverse member m^1 of the carrying frame referred to is adapted for the reception of a hydraulic ram r^1 which is provided to fit within the upper end of a hydraulic cylinder or tube r forming a supporting strut or pillar for the carrying frame. Midway in the length of the strut or pillar a transversely disposed tube or cylinder s is connected at the opposite end of which an operating ram is fitted which extends to the rear and is adapted by means of a screw-threaded fitting s^1 to be moved by a screw-threaded rod s^2 forward and backward within the tube, this being conveniently done by means of a cranked handle s^3 ; it being understood that the respective hydraulic ram and operating piston are suitably packed, and that cup leathers or other packing rings are provided to ensure effective hydraulic joints. It will be understood that on the rotation of the operating handle s^3 the operating piston may be moved forward whereby hydraulic pressure is imposed within the hydraulic cylinder or tube r by which the ram r^1 is raised to the extent desired, thus lifting the carrying frame m to a corresponding extent on its pivoting axis.

The carrying frame is provided near its ends with hook fittings or other means m^2

for carrying a sling, seat, couch or the like. The transversely disposed member of the base frame by which the strut or pillar r is supported may be reinforced by tension members in a similar manner to the longitudinal members of the respective frames.

It will be understood that by so determining the proportions of the operating piston and the hydraulic ram the necessary pressure may be very conveniently imposed by a nurse or attendant for the purpose of raising the carrying frame to the necessary extent.

In order to maintain the sling, seat, couch or the like steady under the movement of the carrying frame, there may be provided means for linking it to the base frame or some part connected therewith. Thus, as illustrated the base frame may carry two brackets t to which are respectively pivoted two links t^1 which may be engaged at the free ends with the sling or the like.

It will furthermore be understood that the invention is not limited to the constructional features hereinbefore specifically described and that the construction may be varied without departing from the invention as set out in the claims.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. Lifting apparatus, more especially for raising invalids or others comprising a base frame, a carrying frame linked to the said base frame, and a supporting strut between the base frame and the carrying frame, the said strut being of adjustable length, substantially as hereinbefore described.

2. Lifting apparatus as set forth in Claim 1, wherein the adjustable strut comprises a column, a screw-threaded spindle and nut engaging the said spindle, and gear mounted in fixed relation to the column for effecting rotation of the nut or alternatively the threaded spindle, substantially as hereinbefore described.

3. Lifting apparatus as set forth in Claim 1, wherein the supporting strut is of telescopic formation and is connected with a piston and cylinder device in such manner as to form a hydraulic lifting mechanism, substantially as hereinbefore described.

4. Lifting apparatus as set forth in Claim 2, wherein the column is provided with a casing for the reception of a worm and worm wheel, the said worm wheel being connected to or forming the nut for engagement with the threaded spindle and the worm being provided with an operat-

ing spindle, substantially as hereinbefore described.

5. Lifting apparatus as set forth in Claim 3, wherein the telescopic strut is provided with a transversely disposed cylinder provided with a piston adapted to be moved longitudinally by such means as a threaded spindle, substantially as hereinbefore described.

6. Lifting apparatus, substantially as 10
hereinbefore described.

Dated this 11th day of June, 1928.

EDWARD EVANS & Co.,
27, Chancery Lane, London, W.C. 2,
Agents for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

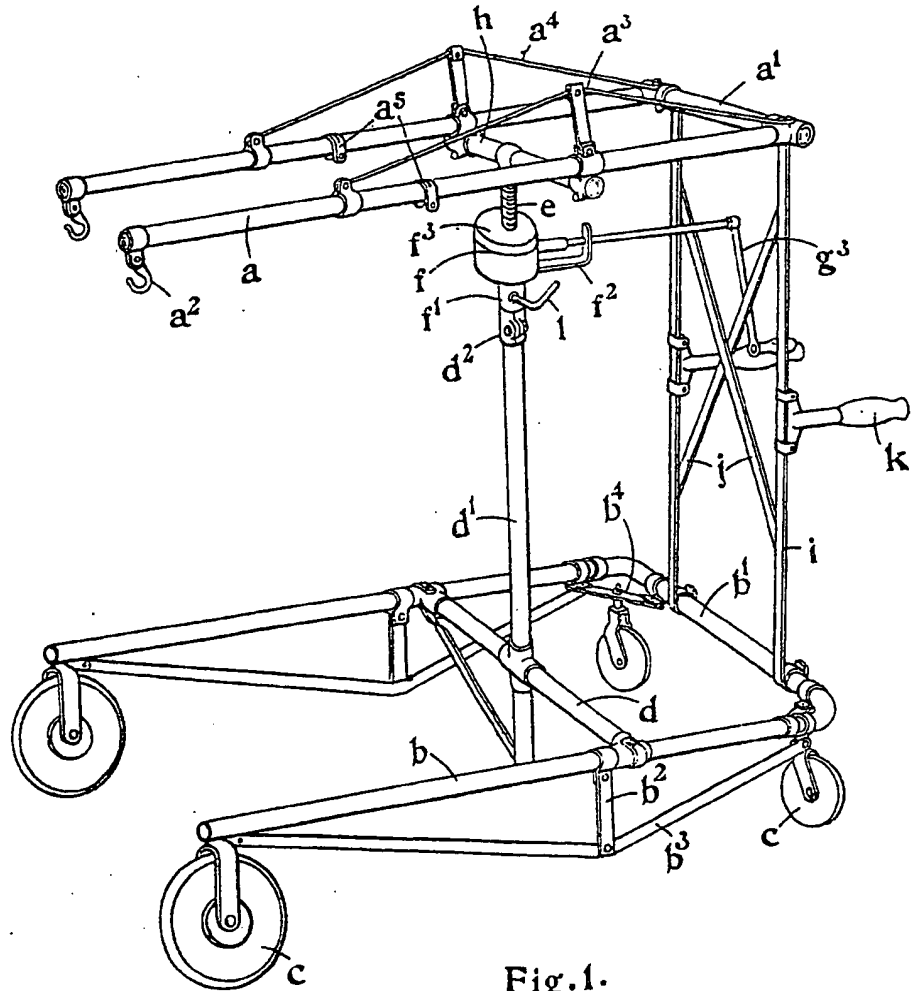


Fig. 1.



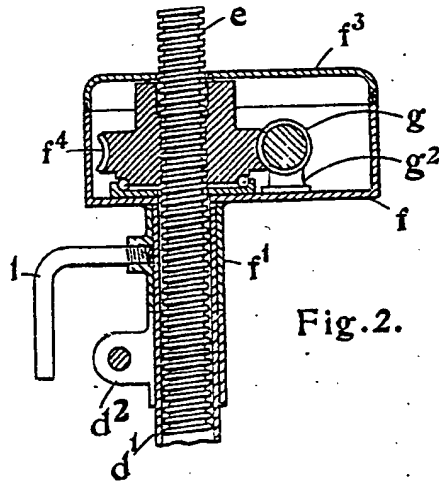


Fig. 2.

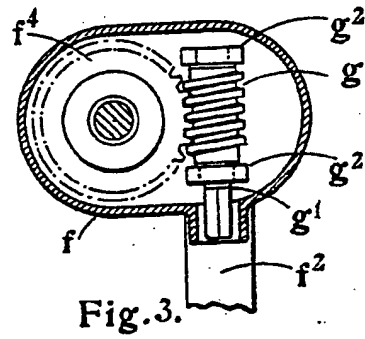


Fig. 3.

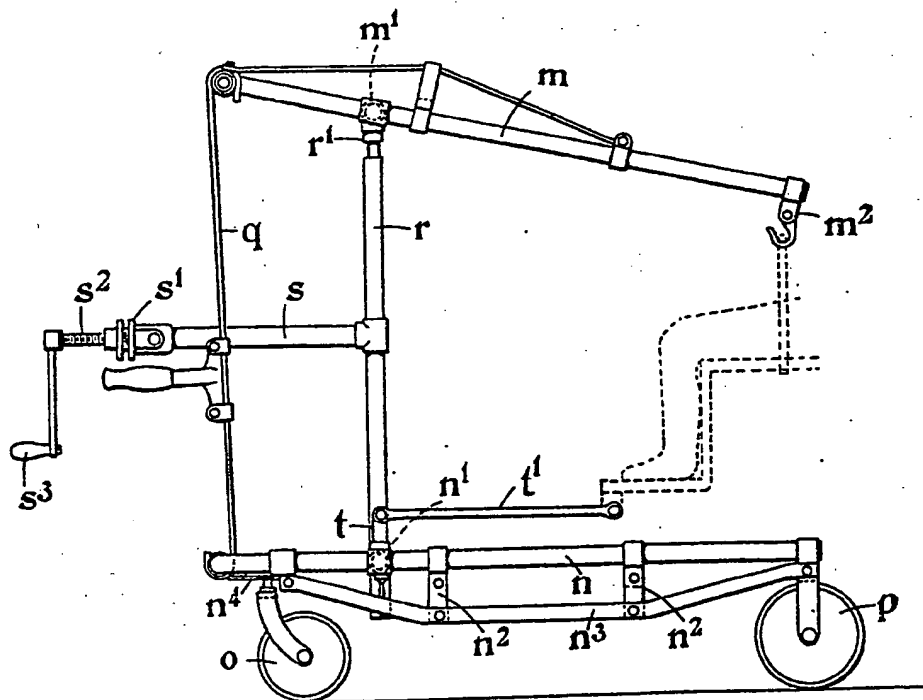


Fig. 4.

[This Drawing is a reproduction of the Original on a reduced scale.]

